

## Decidability Problem For Unranked Propositional Logic

*Tibua Lali; Rukhaia Khimuri*

Department of Mathematics, Faculty of Exact and Natural Sciences,  
Iv. Javakhishvili Tbilisi State University,  
2 University Str., Tbilisi 0186, Georgia  
E-mail: [lali.tibua@viam.sci.tsu.ge](mailto:lali.tibua@viam.sci.tsu.ge) ; [khimuri.rukhaia@viam.sci.tsu.ge](mailto:khimuri.rukhaia@viam.sci.tsu.ge)

Formulas of Unranked propositional logic are proved as algorithmic processes. It is established that all these processes can be completed and their final values are one of the following halting constants:  $T$  (a valid formula),  $F$  (an inconsistent formula) and  $S$  (an indefinite formula).

The following theorems are immediate consequence of the algorithm process :

**Theorem 1.** A formula  $A$  considered as an algorithmic process is fulfilled by the  $T + F$ -strategy and its final value is equal to: a) the halting constant  $T$ , if  $A$  is a valid formula; b) the halting constant  $F$ , if  $A$  is an inconsistent formula, and c) the halting constant  $S$ , if  $A$  is a satisfiable formula..

**Theorem 2.** A valid formula considered as an algorithmic process is fulfilled by the  $T$ -strategy and its final value is equal to the halting constant  $T$ .

**Theorem 3.** An inconsistent formula considered as an algorithmic process is fulfilled by the  $F$ -strategy and its final value is equal to the halting constant  $F$ .

**Theorem 4.** A satisfiable formula differing from a valid formula and considered as an algorithmic process  $T$  or  $F$  or  $T + F$ -strategy is fulfilled and its final value is the halting constant  $S$ .

**Theorem 5.** A formula  $A$  considered as an algorithmic process is fulfilled.